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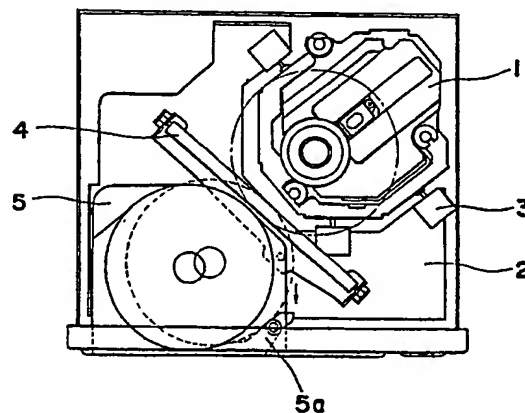
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(54) Disk reproducing apparatus.

(57) The present invention relates to a disk reproducing apparatus which is capable of reproducing a plurality of disks or disks of different diameters. A disk transfer means is provided between a magazine for storing the plurality of disks and a disk musical performance means disposed obliquely, rearwards with respect to the mounting position of the magazine. Also, a single disk insertion opening is provided in the upper portion or the lower portion of the mounting position of the magazine. The disk inserted into the disk insertion opening is also may be transferred by the disk transfer means.

*Fig. 1*



EP 0 391 424 A2

## DISK REPRODUCING APPARATUS

### BACKGROUND OF THE INVENTION

The present invention generally relates to a disk reproducing apparatus which makes it possible to reproduce a plurality of optical disks called compact disks, and/or the disks of different diameters.

For example, the ordinary disks (hereinafter referred to as CD) of 12 cm in size, and the small-diameter of disks (hereinafter referred to as CD single) of 8 cm in size are generally used as the compact disks. In recent years, the CD players for reproduction use thereof have been spread considerable. The CD players for reproduction use of not only a stationary type, but also a potable type, and a car-loading type are extensively put on the market. In addition to the disks of 12 cm, the CD singles of 8 cm appear, which are expected to be remarkable increased even in the future. At the beginning, the CD players have adopted a method of effecting the reproduction with the adapters being provided with respect to the CD singles. But the direct reproduction thereof is gradually increased without the adapters in terms of the improvements in operability, with the tendency thereof of increasing especially in the car-loading use. also, a change type of players are also increased because of the superior operability, because the disks are drawn one by one from the exclusive magazine which has many disks therein to effect the reproducing operation.

Especially in the CD players for car-loading use, the CD single measure without the adapters is behind, because the disk engagement method of a front loading system is used more due to the use thereof within the car. The measures to cope with this problem are desired. Also, even in the change type of CD players, the measures the CD singles have to take are behind, with problems that a setting location is restricted in terms of the size of the main body, and so on.

### SUMMARY OF THE INVENTION

Accordingly, the present invention has been developed with a view to substantially eliminating the above discussed drawbacks inherent in the prior art disk reproducing apparatus and has for its essential object to have an improved change type of disc reproducing apparatus taking advantage of the merits of the prior art disc reproducing apparatus.

Another object of the present invention is to provide a change type of disk reproducing apparatus

which is capable of using both the CDs and the CD singles in the front loading system.

Still another object of the present invention is to provide a change type of disk reproducing apparatus which is capable of making the size smaller by the use of the magazine for CD single use.

In accomplishing these and other objects, according to one preferred embodiment of the present invention, the disk reproducing apparatus is characterized in that the disk musical performance position is constructed obliquely and rearwards with respect to a magazine storing position for CD single use.

Also, the disk reproducing apparatus of the present invention is characterized in that in the above described construction, an inserting opening for loading the CD is provided in the upper portion or lower portion of the magazine storing position.

Also, the disk reproducing apparatus of the present invention is characterized in that in the above described construction, a disk feed roller is provided which is adapted to effect a vertical operation at the disk movement from the magazine, and to effect a pivoting movement around a shaft provided on the stationary basic plate at the disk movement from the direct insertion opening.

The present invention has an advantage in that in the accommodation of a magazine of the CD singles onto the space restricted space of a DIN size for car-loading use, the musical performance position is arranged obliquely, and rearwards with respect to the accommodation position, so that the space may be effectively used and the function of the auto-changer operation may be used.

Also, the present invention has an advantage in that a change function by the magazine and a direct insertion opening of the CD or the CD single are provided, so that only the one loading of the ordinary disk may be effected, and the continuous reproduction by the magazine, the reproduction through the direct insertion without the use of the magazine may be both effected, with the purposes thereof being used properly.

Also, it may be used for both at the change operation and the direct insertion by the vertical movement and the pivoting operation of a set of rollers, with an advantage that the number of the components may be reduced and the space may be saved, as compared with a case where the exclusive rollers are respectively arranged.

### BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects and features of the

present invention will become apparent from the following description taken in conjunction with the preferred embodiment thereof with reference to the accompanying drawings, in which;

Fig. 1 is a plan view showing the relationship between a magazine of a CD player of the present invention and a disk musical performance position thereof;

Fig. 2 is a side view thereof;

Fig. 3 is a plan view in a case where a magazine and a direct insertion opening are provided;

Fig. 4 is a front face view showing a front panel in that case;

Fig. 5 is an illustration view showing a method of discriminating between the CD and the CD single;

Fig. 6 is an illustrating view showing the engagement operation of the CD after the discrimination thereof has been effected;

Fig. 7 is an illustrating view showing the engagement operation of the CD single after the discrimination has been effected;

Fig. 8 and Fig. 9 are side face views each showing a method of preventing the double insertion of the disk during the musical performance or during the operation;

Fig. 10 and Fig. 11 are side views each showing a method of effecting the disk loading operation by the difference between the fixing of the traverse mechanism and the floating condition;

Fig. 12 through Fig. 14 show an example of the space saving operation about the disk engagement from the magazine;

Fig. 12 is a plan view showing the drawing operation and the horizontal movement of the disk from the magazine;

Fig. 13 is a side face view showing the horizontal movement during and after the descending operation of the disk; and

Fig. 14 is a plan view showing the positions of the CD and the CD single, and the magazine in the disk engagement position.

#### DETAILED DESCRIPTION OF THE INVENTION

Before the description of the present invention proceeds, it is to be noted that like parts are designated by like reference numerals throughout the accompanying drawings.

Referring now to the drawings, there is shown in Figs. 1 and 2, the relationship between the magazine of the CD player and the disk musical performance position according to one preferred embodiment of the present invention. Fig. 1 shows a condition of an 1DIN size CD player seen from above. Fig. 2 is a side view thereof. The CD player

as the disk reproducing apparatus of the present invention includes a traverse mechanism 1, which effects the ordinary traverse operations such as disk rotation, optical pick movement, and so on so as to read the signals of the disk faces, a mechanism basic plate 2 with various mechanism components being mounted on it, a dumper rubber 3 which is fixed on the mechanism basic plate 2, is engaged with the traverse mechanism 1, and is provided with a buffer function so that the impact, oscillations may not be transmitted into the traverse mechanism, a roller arm 4 which is disposed for its vertical operations on the mechanism basic plate 2, and causes the disk to move at the roller rotating operation by the pressure fixing of a pair of rollers 4a, 4b, and has a member built-in, in the roller arm 4, as a guide so that the disk may not be shake vertically with the disk grasped between the rollers being overhung in the horizontal movement of the disk, a magazine 5 with three CD singles being stored therein, has disk take-out levers 5a, 5b, 5c arranged corresponding to each disk of three CD singles so as to have a function of engaging the disk into between the rollers by the pushing operation in the arrow mark direction. The traverse mechanism 1 and the magazine 5 are composed diagonally in the 1DIN size, and the roller arm 4 is obliquely arranged between the traverse mechanism and the magazine. Referring to Fig. 2, reference numeral 6 is a first disk, which is stored in the upper stage of the magazine 5, reference numeral 7 is a second disk which is stored in the intermediate stage thereof, and reference numeral 8 is a third disk which is stored in the lower stage. Reference numeral 9 is a clamper which has relation to be adsorbed by a centering ring 1a of the traverse mechanism 1 and a magnet so as to effect the disk clamping operation at the engagement of the disk. By the pushing operation of the disk take-out lever 5a of the magazine 5, the disk 6 is projected out of the magazine 5 so that the disk is grasped between the passive roller 4a and the driving roller 4b. The disk 6 effects a horizontal movement onto the right hand side by the clockwise rotation of the driving roller 4b. The rotation of the driving roller 4b is stopped in a position where the disk has been drawn completely out of the magazine 5. The roller arm 4 is caused to effect the downward movement with the disk 6 being grasped between them. The disk 6 has been caused to come to a stop in a position where it may be engaged with the centering ring 1a. Thereafter, the passive roller 4a is upwardly escaped, and the driving roller 4b is downwardly escaped so as to provide a condition capable of effecting the musical performance. In this case, the clamper 9 is in a position above the disk to be drawn out from the magazine 5, and descends according to the

downward movement of the disk or after the movement. Also, after the disk has been clamped onto the traverse mechanism 1 by the clasper 9, the rollers 4a, 4b move in the separating direction, needless to say, to allow the disk to be rotated. Such construction as described hereinabove allows the magazine 5 to be completely accommodated into the panel within the space of the 1DIN, and may simplify the operation necessary for the drawing out operation of the disk.

Fig. 3 is a plan view showing a case where the direct insertion may be effected by the front loading operation in the construction described in Fig. 1 and Fig. 2. Fig. 4 shows a front panel in this case. Referring to Fig. 3, the roller arm 4 is in a truly lateral condition by the rotation in a counter-clockwise direction around the pivoting shaft 4c from the condition of Fig. 1, and is lowered down to a position where it is not in contact against the magazine 5 even in the height direction. Referring to Fig. 4, there are a direct insertion opening 10 which is provided in a location corresponding to the above described position of the roller arm 4, and a magazine storing opening 11 constructed above the direct insertion opening. Also, a button A in Fig. 4 is provided to select a disk. The button effects a switching operation of a condition of reproducing the disk inserted from the direct insertion opening 10 or a condition of reproducing the disk provided within the magazine 5 of the magazine storing opening 11. Every time the button A is depressed, the condition is alternately switched. For example, the change from Fig. 1 condition of the roller arm 4 to Fig. 3 condition is also effected by the depressing operation of the button A. When the button A is depressed in the condition of the roller arm 4 of Fig. 1, the condition of the roller arm 4 is provided as shown in a solid line of Fig. 3. When the button A is depressed again, the original condition of Fig. 1 is provided by the reverse operation. In a case where the disk 13 or 14 has been inserted into the direct insertion opening 10 in the condition of Fig. 3, the insertion disk 13 or 14 is detected by a photo-sensor B1 or B2 provided near the insertion opening 10, the rotation of a pair of rollers 4a, 4b of the roller arm 4 starts, and the disk effects the horizontal movement as far as the constant position by a method to be described later. Also, the roller arm 4 is rotated in the clockwise direction by a switch not shown) for detecting the insertion of the magazine 5 into the magazine storing opening 11 (or by the depression of the above described button A) in the condition of Fig. 3, and becomes the first condition again, so that the disk engagement from the magazine 5 may be effected. In such construction as described hereinabove, by the vertical movement and the pivoting operation of the roller arm 4, it may be used for both the disk

engagement from the magazine 5 and the disk engagement from the direct insertion opening 10, so that the number of the members may be reduced and the space may be saved, two methods of effecting musical performance may be used properly by the purposes, the CD single may be inserted from the direct insertion opening 10 and stored into the magazine 5 or the reverse operation thereof may be effected.

Fig. 5 shows a method of discriminating the CD and the CD single. Reference characters 12a, 12b are 8 - 12 detection guides, and operatively cooperate with the roller arm 4 so as to stop the advance of the inserted disk with the roller arm 4 being truly lateral. Also, the detection guide 12b is adapted to externally escape as shown in the broken line in Fig. 6 and Fig. 7 to be described later with the shaft 12d of the base portion of the arm 12c being a center when the roller arm 4 has pivoted in the clockwise direction as shown in Fig. 1 so as not to come into contact against the disk. Also, the 8 - 12 detection guides 12a, 12b are disposed one by one right and left in such a size as to come into contact with the external periphery of the CD 13. When the CD 13 has been inserted in the above described construction, the CD 13 is moved in an arrow mark direction, and thereafter, is stopped by the 8 - 12 detection guides 12a, 12b. Also, when the CD single 14 has been inserted, the CD 14 is likewise moved in the arrow mark direction, and thereafter, is stopped in a position with the CD single being grasped between the 8 - 12 detection guides 12a, 12b. When the CD single 14 has been inserted in a position shifted right or left, the CD single 14 is to stop finally in the same position so as to receive the directional correction by the 8 - 12 detection guides 12a, 12b. The roller of the roller arm 4 which is used in this case is narrower in the diameter of the central portion as compared with both the ends thereof, and the grasped CD single is likely to come closer towards the center. Accordingly, as each disk stops at a constant position, a portion where only either of the CD 13 and the CD single 14 exists is provided. Three photo-sensors B1, B2, B3 are disposed in the positions shown through the consideration of the portion, so that the discriminating operation may be effected whether the disk inserted from the insertion opening is the CD or the CD single. Namely, when the photo-sensor B3 of the tip end has detected the disk, it is discriminated that the CD single 14 has been inserted into the final position, and only the sensor B2 detects the disk. When the sensors B1, B3 do not detect the disk, it is discriminated that the CD 13 has been inserted into the final position.

Fig. 6 shows the operation in a case of the CD after the discrimination by Fig. 5. The roller arm 4

effects its pivoting operation in the clockwise direction with the pivoting shaft 4C being provided as a center, and with the CD 13 remaining grasped between the rollers 4a and 4b of the roller arm 4 and becomes a condition shown in the broken line. By the pivoting operation, the guide 12b from the 8 - 12 detection guides 12a, 12b is externally escaped not to come into contact with the disk in the position after the pivoting operation. By the rotation of the rollers 4a, 4b of the roller arm 4, the horizontal movement of the disk is effected again to stop the rotation at the musical performance position reached, and the clamper 9 is lowered with respect to the traverse mechanism 1, so that the CD 13 is grasped by the centering ring 1a and the clamper 9 into the engagement condition.

Fig. 7 shows the operation in a case of the CD single after the discriminating operation by Fig. 5. The roller arm 4 pivots in the clockwise direction into the condition shown in the broken line with the pivoting shaft 4C as a center, and with the CD single 14 remaining grasped by the rollers 4a, 4b of the roller arm 4. By the pivoting operation, the guide 12b from between the 8 - 12 detection guides 12a, 12b is externally escaped so as not to come into contact with the disk in the position after the pivoting operation. At this time, the original positions of the 8 - 12 detection guides 12a, 12b are set with respect to the traverse mechanism 1 so that the position of the CD single 14 after the pivoting operation thereof may become an engagement position. Thus, by the lowering operation of the clamp 9 with respect to the traverse mechanism 1 after the pivoting operation of the roller arm 4, the CD single 13 may be grasped by the centering ring 1a and the clamper 9 into the engagement condition. By such construction as described hereinabove, the discriminating operation between the CD and the CD single may be effected and the engagement operation may be effected in accordance with the case of the respective disks.

Fig. 8 and Fig. 9 show the construction for preventing the double insertion of the disk during the musical performance or during the operation. Fig. 8 shows a condition where the disk may be inserted. Fig. 9 shows a condition where the disk is prevented from being inserted. In Fig. 8, reference numeral 15 is a prevention lever, which is mounted for its vertical motion on the mechanism basic plate 2, and is subject to the spring urging force in its upward direction or regulated in the operation in the lateral direction. When the roller arm 4 is located in a position corresponding to the insertion opening as shown in Fig. 3, the prevention lever 15 is in the engagement relation with respect to the lower arm 4, and is stopped in its descent position with respect to the spring urging force. Therefore, when the disk 13 or 14 is inserted from the direct

insertion opening 10, it may reach between the rollers 4a and 4b of the roller arms 4. In Fig. 9, when the roller arm 4 is in such a position as shown in Fig. 1, the roller arm 4 is released in the engagement relation with the prevention lever 15, is not in the prevention position, with the prevention lever 15 being upwardly raised by the spring urging force. At this time, the prevention lever 15 closes the disk passing range of the direct insertion opening 10. Accordingly, the prevention lever 15 prevents the loading from being effected if the disk is intended to be inserted. In such construction as described hereinabove, in the condition provided during the musical performance or the change operation, the roller arm 4 is in the condition of Fig. 1, with the condition where the direct insertion may be effected being provided only in Fig. 3, so that the preventing conditions as the object is provided. Therefore, such simple construction as described hereinabove may prevent the double insertion during the musical performance or the change operation.

Fig. 10 and Fig. 11 show a method of effecting the disk loading operation by the difference between the traverse mechanism fixing and the floating condition. Fig. 10 shows the fixing condition of the traverse mechanism. Fig. 11 shows the floating condition of the traverse mechanism. In Fig. 10, reference numeral 16 is a stationary lever, which is disposed for its pivoting operation by the mechanism basic plate 2 so that the traverse mechanism 1 may be downwardly depressed. Reference numeral 17 is a stationary guide, which is mounted on the mechanism basic plate 2 so as to secure the traverse mechanism 1 with the stationary pin 1b of the traverse mechanism 1 being grasped by the V shaped groove portion and the stationary lever 16. Reference numeral 18 is a spring, which is floated with the traverse mechanism 1 being suspended. Since the traverse mechanism 1 is downwardly depressed in the condition of Fig. 10, it is possible to move the disk horizontally so as to arrange it on the centering ring 1a of the traverse mechanism 1. Then, the stationary lever 16 is upwardly pivoted as shown in Fig. 11 so as to release the insertion of the stationary pin 1b of the traverse mechanism 1, so that the traverse mechanism 1 is upward moved by the spring 18 into the floating condition, and is stable in a position balanced by the spring 18. After the traverse mechanism 1 has been raised, the disk is put into the engagement condition by the centering ring 1a and the clamper 9. By such construction as described hereinabove, the movement of the disk allows the floating operation only in the horizontal direction, and further, the space which is provided with the degree of freedom necessary for the floating operation may be effectively used.

Fig. 12 through Fig. 14 show an embodiment of the saved space about the disk engagement from the magazine. Fig. 12 shows the draw-out operation and the horizontal movement of the disk from the magazine. Fig. 13 shows the descent of the disk and the horizontal movement after the descent. Fig. 14 shows the positions of the CD and the CD single in the disk engagement position, and the magazine. Reference numeral 19 is an upper guide pin, which is provided to stop in the setting position the horizontal movement of the CD single drawn out from the magazine 5. Reference numeral 20 is a lower guide pin, which is provided to stop the CD single in the engagement position, so that it is adapted to be escaped so as not to come into contact against the CD single in the musical performance condition. In Fig. 12, the disk 6 which has been drawn from the magazine 5 in a method similar to that of Fig. 2 effects the horizontal movement in the arrow mark direction by the rotation of the rollers of the roller arm 4 to come into contact against the upper guide pin 19 so as to come to a stop. The rotation of the roller is stopped through the detection by the switch, the photo-sensor or the like, or through the time setting. In Fig. 13, the disk 6 grasped by the rollers 4a, 4b of the roller arm 4 moves from the position of the broken line to the position of the solid line by the descending operation of the roller arm 4, and further effects the horizontal movement in the arrow mark direction by the reverse rotation of the driving roller 4b to come into contact against the lower guide pin 20 so as to come to a stop. The rotation of the driving roller 4b is also detected by the switch, the photo-sensor or the like as in the draw-out operation from the magazine 5. The solid line 6 in Fig. 14 shows the position of the disk 6 (CD single) in the musical performance condition. Also, in a case where the CD 13 is engaged from the insertion opening, the position is provided as shown in the drawing. As compared with Fig. 2, where the plane condition of the position shown in the broken line, with the disk 6 being lowered from the height of the magazine 5, is provided as the engagement position, the space necessary for the engagement, the musical performance of the CD 13 may be reduced. In the case of Fig. 14, the outer periphery of the CD 13 is kept adjusted into the position of the broken line of the disk 6 so that the lower space of the magazine 5 may be taken up more.

In order to effect the initial resetting operation, in such construction as described hereinabove, when the power supply has been put to work again after the interruption of the musical performance due to the power turn off or the like, the disk 6 shown in the solid line in Fig. 13 is further moved horizontally in the arrow mark direction by the roller arm 4, and is discharged from the direct insertion

opening 10 shown in Fig. 4. When the controlling operation is effected in this manner, the discriminating operation between the disk taken out from the magazine 5 and the disk inserted from the direct insertion opening 10, and the discharging operation thereof are not necessary to be effected when the power supply has been put into work again, thus simplifying the controlling operation.

As described hereinabove, the present invention has an advantage in that the construction of the disk musical performance position is constructed diagonal with respect to the magazine accommodating position for the CD single use to allow the effective use of the space and the use of the function of the auto-changer in the storing operation of the magazine of the CD single on the restricted space of the DIN size for the car loading use.

Also, the inserting opening for loading the CD in the upper portion or the lower portion of the magazine storing position is provided to make it possible to have the change function by the magazine, to have the direct loading of the CD, and to have both the continuous reproduction by the magazine and the reproduction by the direct insertion without the use of the magazine, thus allowing the proper use by the purposes.

Also, since one set of rollers may be used both at the change operation and the direct insertion time by the vertical motion and the pivoting operation, with an advantage that the number of the components may be reduced and the space may be saved as compared with a case where an exclusive roller is disposed respectively.

Also, by the disk guide member provided forwardly in the roller feed direction, each of the CD and the CD single is adapted to stop its movement in the given position by the disk guide member provided forwardly in the roller feeding direction so as to effect the electrical or mechanical detection through the difference between the stop positions, with an advantage that it becomes easier to discriminate the type of the disks, and to discriminate the movement into the next operation as wrong or right.

Also, by the difference between the stop positions, the rotation amount of the roller or the rotation amount of the disk feed or the position of a guide member for the disk musical performance locating operation use operatively cooperated with the pivoting member of the roller, with an advantage that the respective disks may be moved into the musical performance position by the respective methods.

Also, by the operative cooperation of the disk insertion preventing member with the pivoting member of the roller, the double insertion of the disk may be prevented during the halfway opera-

tion such as during the disk musical performance, during the drawing-out operation of the disk from the magazine or the like.

Also, since the disk which is being drawn out is discharged from the direct insertion opening during the initial resetting operation despite the disk drawn out of the magazine or the disk inserted from the direct insertion opening, the accommodation position of the original disk is not necessary to be electrically or mechanically stored, with an advantage that the number of the components may be reduced and the initial resetting control may be simplified.

Also, the musical performance position of the CD single, with respect to the magazine accommodating position for CD single use, becomes a position, where the disk is horizontally drawn out from the magazine, thereafter moves vertically, further effects the horizontal movement in the magazine direction, thus making the necessary space smaller.

Also, by the downward fixing of the traverse at the loading time, the engagement operation of the disk may be horizontally moved, also by the releasing of the fixing, the traverse is raised to effect the clamping operation of the disk, and at the same time to be put into the floating condition having the degree of lateral, longitudinal freedom, thus making it possible to effect the stable musical performance free from the sound skipping with respect to the car oscillations, with an advantage that the operation is simplified and the space is saved.

although the present invention has been fully described by way of example with reference to the accompanying drawings, it is to be noted here that various changes and modifications will be apparent to those skilled in the art. Therefore, unless otherwise such changes and modifications depart from the scope of the present invention, they should be construed as included therein.

## Claims

(1) A disk reproducing apparatus comprising a magazine with a plurality of disks being stored therein, a disk musical performance means disposed in a position deviated obliquely, rearwards with respect to the mounting position of the magazine, a disk transfer means which is disposed between the mounting position of the magazine and the disk musical performance means, and is operated so as to effect the transfer of the disk between the magazine engaged in the mounting position and the disk musical performance means.

(2) A disk reproducing apparatus described in accordance with the claim 1, wherein the disk transfer means includes a retaining member which

is capable of effecting a vertical movement so as to correspond to the position of each disk accommodated in the magazine, and one set of disk feed rollers supported for the vertical movement by the retaining member.

(3) A disk reproducing apparatus comprising a magazine for storing a plurality of first disks, a disk musical performance means arranged in a position deviated obliquely, rearwards with respect to the mounting position of the magazine, a disk insertion opening disposed in the upper portion of the mounting position or the lower portion thereof for the engagement of the second disk which is different in diameter from the first disk, a disk transfer means which is disposed between the mounting position of the magazine, the disk insertion opening, and the disk musical performance means, and is operated so as to effect the transfer of the disk between the magazine engaged in the mounting position, the disk insertion opening, and the disk musical performance means.

(4) A disk reproducing apparatus described in accordance with the claim 3, wherein the disk transfer means includes one set of disk feed rollers which are capable of effecting a vertical movement so as to correspond to position of each of the first, second disks, a retaining member which retains the disk feed roller and may pivot around the fixed point on the stationary basic plate, and is adapted to wait in a condition orthogonal with respect to the insertion direction of the second disk into the disk insertion opening for the transfer of the second disk engaged with the disk inserting opening, to wait in a condition rotated by the given angle with respect to the insertion direction of the second disk into the disk insertion opening for the transfer of the first disk accommodated in the magazine.

(5) A disk reproducing apparatus comprising a disk insertion opening into which the first, second disks each different in diameter may be engaged with, a disk musical performance means disposed in a position deviated obliquely, rearwards with respect to the disk insertion opening, a disk transfer means to be operated so as to effect the transfer of the disk between the disk insertion opening and the disk musical performance means, one pair of detection guide members which are provided in the forward position of the disk transfer means in the disk insertion direction into the disk insertion opening, and move to prevent in the given position each of the first disk and the second disk to be inserted into the disk insertion opening, a sensor disposed to detect the difference in the stop condition between the first and the second disks by the one pair of detection guide members so as to discriminate between the first, second disks inserted into the disk insertion opening.

(6) A disk reproducing apparatus described in

accordance with the claim 5, wherein the disk feed amount by the disk transfer means is adapted to be selected from the sensor output in accordance with the first, second disks.

(7) A disk reproducing apparatus comprising a magazine for storing a plurality of first disks, a disk musical performance means arranged in a position deviated obliquely, rearwards with respect to the mounting position of the magazine, a disk insertion opening disposed in the upper portion of the mounting position or the lower portion thereof for the engagement of the second disk which is different in diameter from the first disk, a disk transfer means which is disposed between the mounting position of the magazine, the disk insertion opening, and the disk musical performance means, and is operated so as to effect the transfer of the disk between the magazine engaged in the mounting position, the disk insertion opening, and the disk musical performance means, a preventing member to be correspondingly operated by the disk transfer means so as to prevent the disk insertion from the disk insertion opening at the disk musical performance time by the disk musical performance means or at the first disk transfer time from the magazine.

(8) A disk reproducing apparatus described in accordance with the claim 3, wherein the disk which stays in the musical performance position or is in the course of the transport is adapted to be discharged from the disk insertion opening, despite the original accommodation position of the disk, in accordance with the initial resetting operation to be effected, in a case where the power supply has been turned off, has put to work again, or the like in the musical performance condition or during the operation switching.

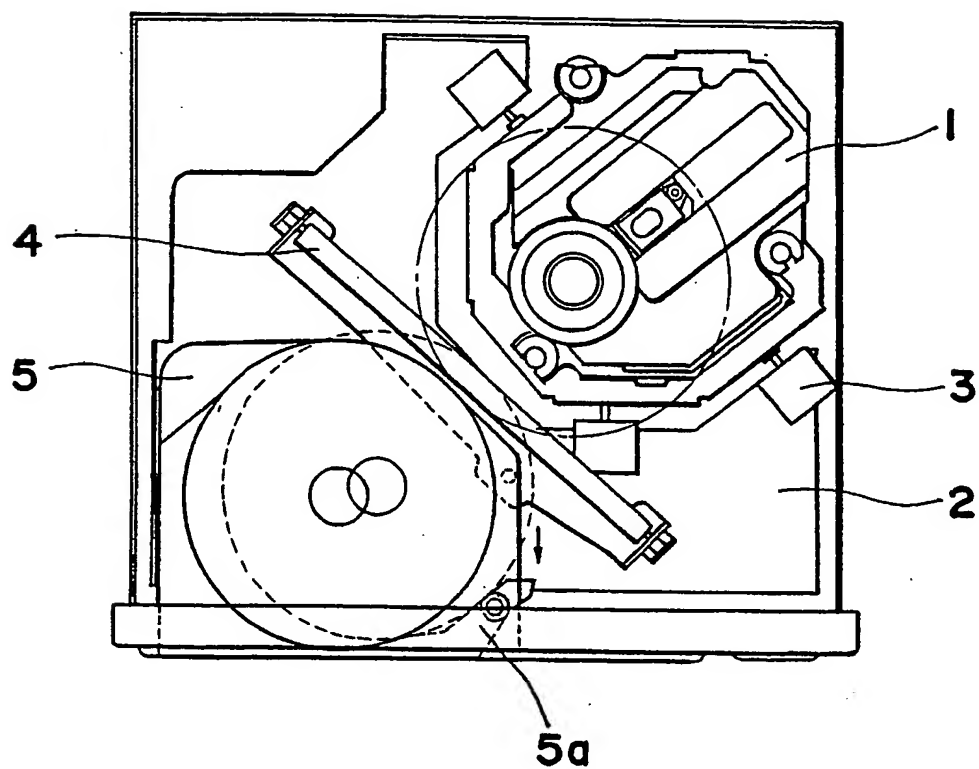
(9) A disk reproducing apparatus comprising a magazine with a plurality disks being stored therein, a disk musical performance means disposed in a position which is not in contact with the magazine in the height direction with respect to the mounting position of the magazine, with the disk provided in the musical performance position being different in position from the magazine, a disk transfer means which is disposed between the mounting position of the magazine and the disk musical performance means, and is operated so as to effect the transfer of the disk between the magazine engaged in the mounting position and the disk musical performance means, a first guide which effects the positional regulation of the disk drawn out horizontally from the magazine, a second guide which is disposed under the mounting position of the magazine so as to effect the positional regulation of the disk to be reversely moved horizontally in the magazine direction, so that the disk transfer means is adapted to effect the vertical movement after the disk

has been horizontally drawn out from the magazine, and further to move into the musical performance position after the horizontal movement has been effected in the magazine direction.

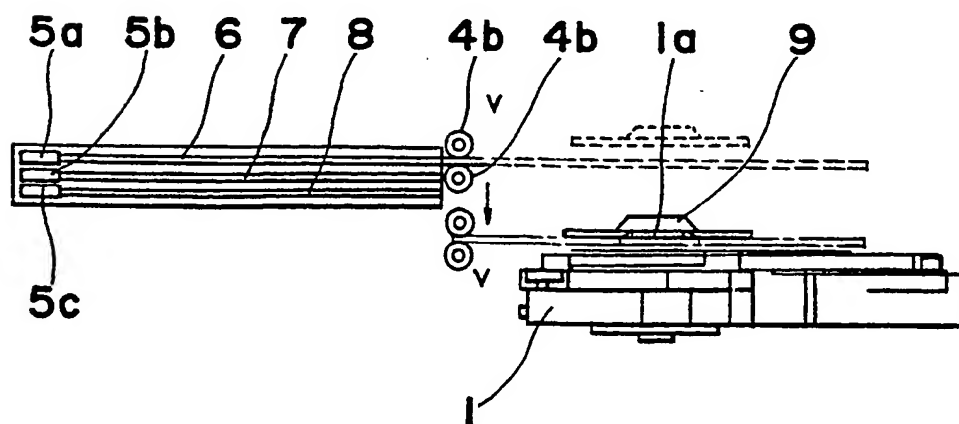
(10) A disk reproducing apparatus described in accordance with either of the claims 1 through 9, wherein the disk musical performance means includes a traverse main body which is upwardly urged with a spring, a rubber or the like into the floating condition at the disk musical performance time, so that the traverse main body is adapted to be secured downwardly at the horizontal movement of the disk by the disk transfer means.



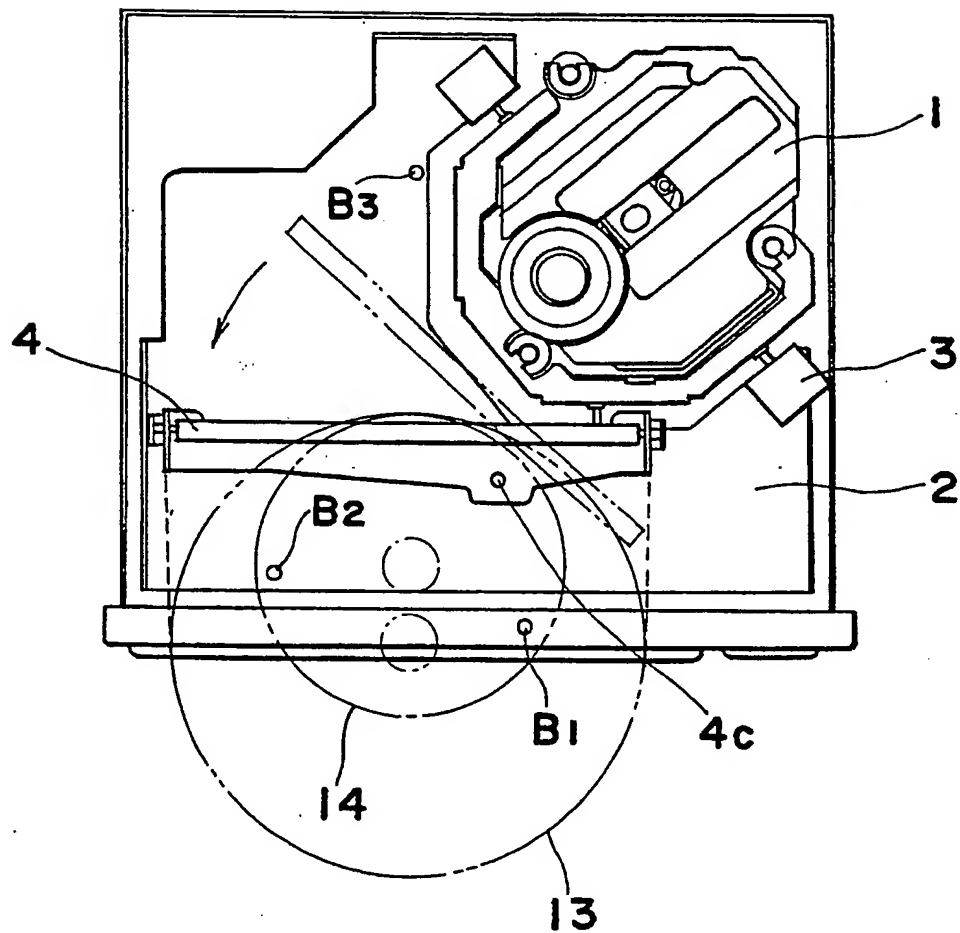
*Fig. 1*



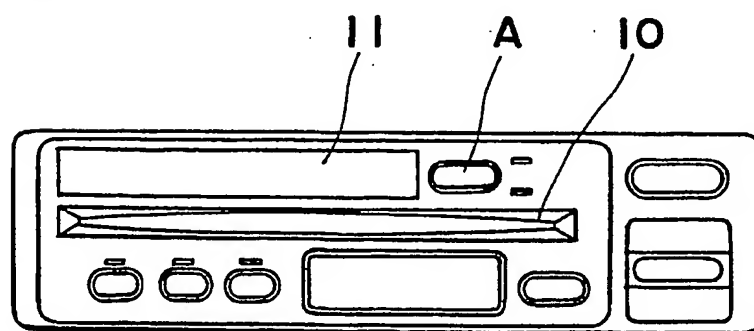
**Fig. 2**



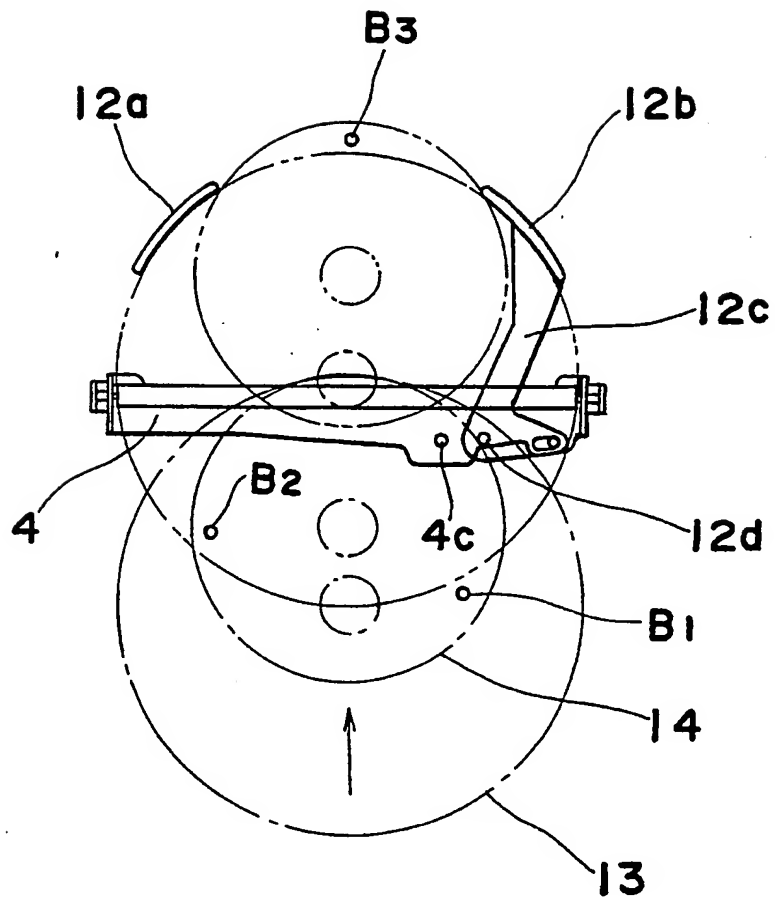
*Fig. 3*



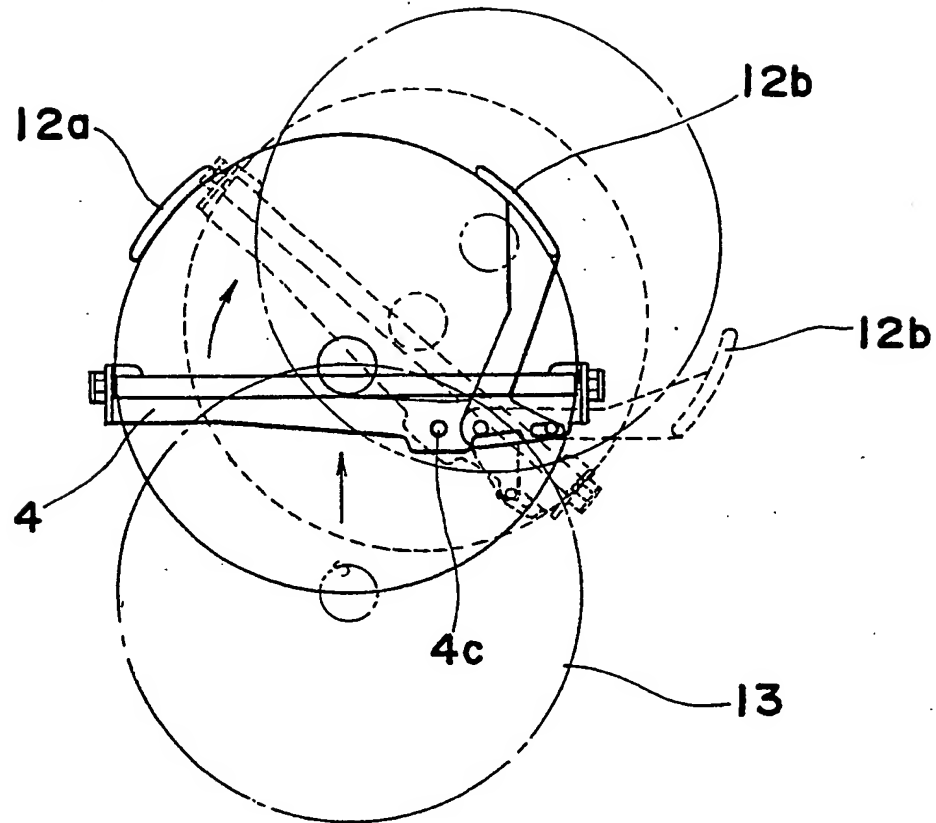
*Fig. 4*



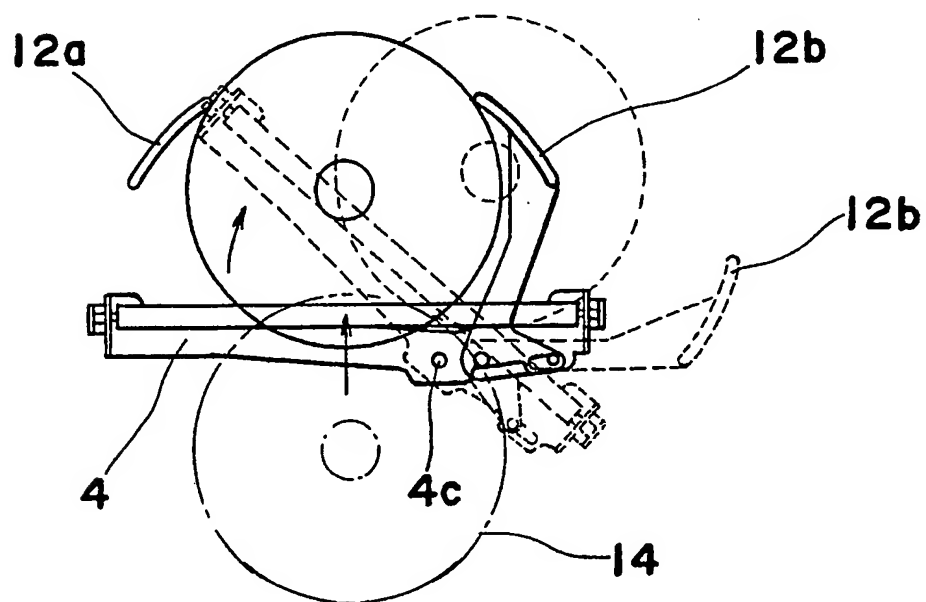
*Fig. 5*



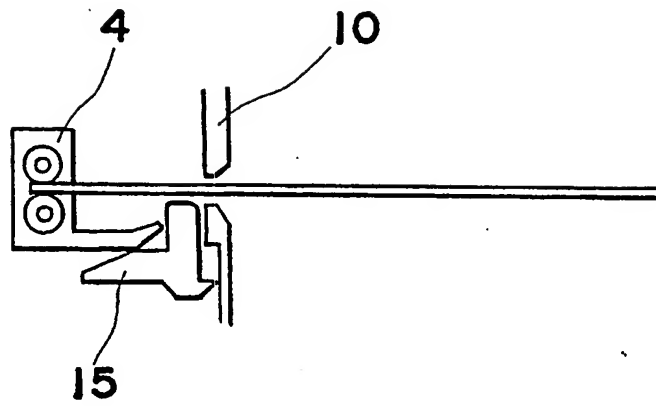
*Fig. 6*



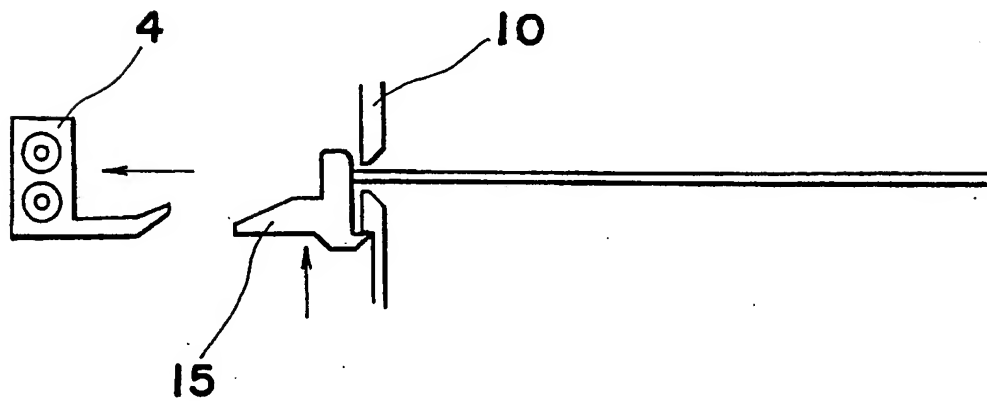
*Fig. 7*



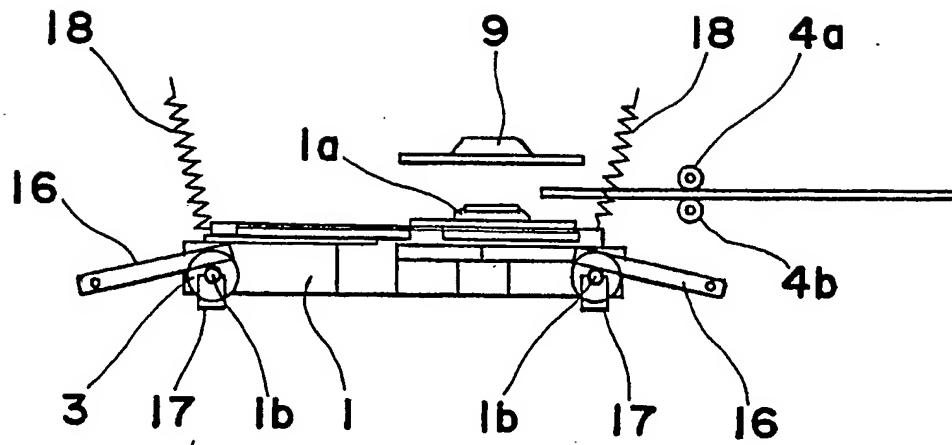
*Fig. 8*



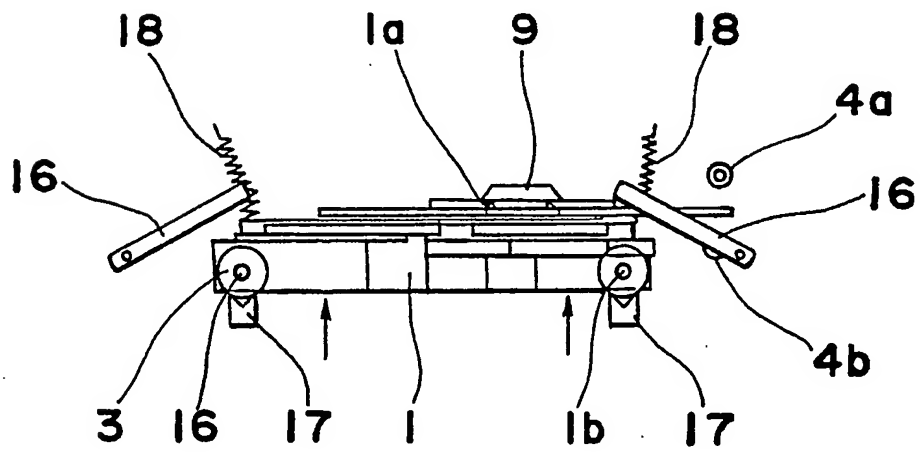
*Fig. 9*



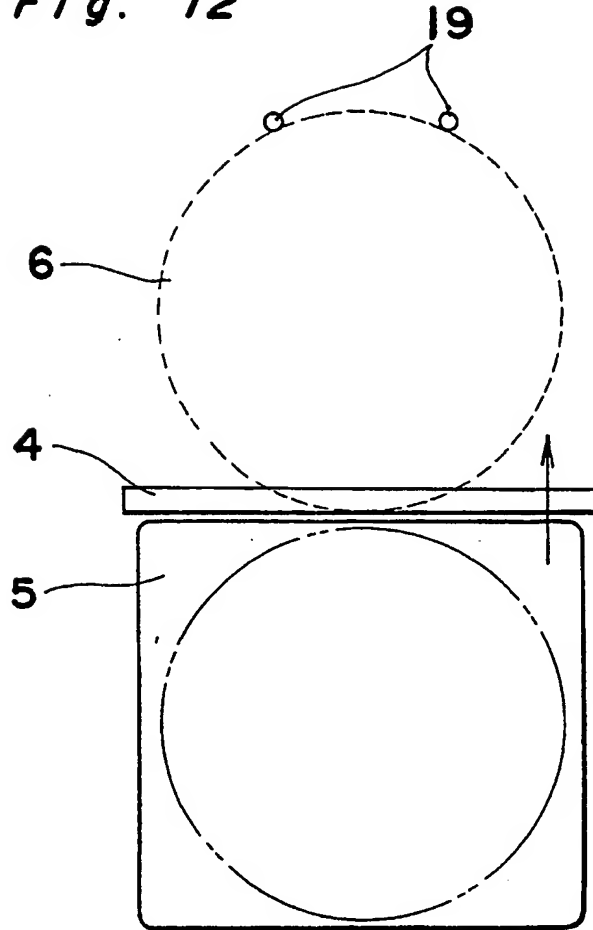
*Fig. 10*



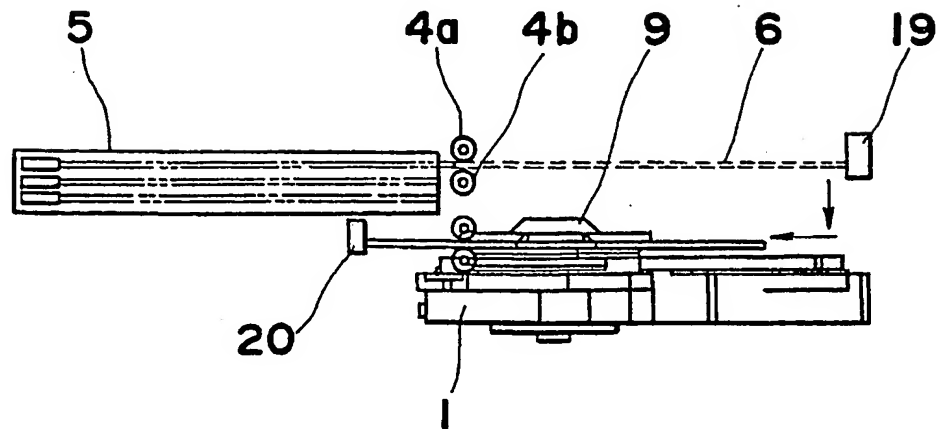
*Fig. 11*



*Fig. 12*



*Fig. 13*



*Fig. 14*

